

Remarks

Claims 1-27 are pending in this application. Claims 24-27 are withdrawn from consideration. Claims 1-23 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. (U.S. Publication No. US 2002/0124662 A1) in view of Daire et al. (U.S. Patent No. 5,440,930). Applicant believes that the invention is patentable.

Applicant respectfully requests that the Examiner withdraw the finality of the rejection. The Examiner has introduced a new ground of rejection that has not been necessitated by Applicant's amendment of the claims. In the previous reply, Applicant had amended claims 1 and 23 to more particularly point out the invention. Claims 14-22 were not affected by the amendment and had previously been allowed.

According to claim 1, an acoustic transducer for measuring a property of a fluid comprises an acoustic pulse generator, an impedance matching layer, and a thermal management system. The impedance matching layer is between the pulse generator and the fluid. The matching layer is formed of a low thermal conductivity material. The impedance matching layer has reduced length to the point where traveling waves are no longer present. The thermal management system is mounted to the matching layer to transfer heat from the matching layer. The thermal management system is formed of a high thermal conductivity material relative to the matching layer and is arranged along the matching layer such that substantial heat is transferred to the environment from the thermal management system without excessive temperature increase at the pulse generator.

As explained in the Background Art section of Applicant's specification, a disadvantage associated with existing buffer systems is that a short buffer has problems when operating with hot fluids, while making the buffer longer requires that the buffer guide the wave front in the desired direction. Further, solid buffers fail to effectively guide the acoustic pulse resulting in a dispersive buffer that distorts the ultrasonic pulse and limits the usefulness of the flow meter. (Page 2, lines 6-10.)

Suzuki describes an ultrasonic transducer and flow meter. The Examiner acknowledges that Suzuki is deficient in that the claimed thermal management system is not suggested by Suzuki.

There is no motivation to combine Suzuki and Daire to achieve the claimed invention. Suzuki adopts a short buffer approach and is directed specifically to transducer manufacture. Daire describes an ultrasonic measuring assembly and means for attaching the assembly to a vessel.

In the illustrated embodiment, Daire describes simultaneously clamping the emitter 13 and receiver 14 against the spacers 11 and 12. As shown, the spacers 11, 12 are formed of a thermally conductive material and thin air cooling fins 20 are formed on the outer periphery of each spacer. As clearly depicted in Figures 1 and 2, the spacers 11 and 12 function as longer buffers as they sit between the transducers and the pipe 10 and are shaped in a way that would not effectively guide the wave front. As well, the overall assembly is clamped to the outside of pipe 10 resulting in further buffering of the pulses, limiting the usefulness of this flow meter.

There is no suggestion to combine these references to achieve the claimed invention. It is not clear that any of the teachings of Daire would be readily usable in the short buffer approach of Suzuki without resulting in a longer buffer approach due to the fact that the spacers in Daire sit between the transducers and the pipe. Accordingly, any combination of these two references fails to suggest the specific claimed combinations. For example, claim 1 specifically recites “an impedance matching layer between the pulse generator and the fluid” in combination with the thermal management system arranged along the matching the layer, etc.

According to the teachings of Daire, there is not an impedance matching layer that sits between the pulse generator and the fluid. In contrast, the spacers and the pipe fit between the pulse generator and the fluid. Even if an attempt is made to modify Suzuki to

incorporate the thermal management system of Daire, such a combination would fail to meet the limitations of Applicant's claims as such combinations would effectively be attempting a longer buffer approach where the longer buffer is composed of the pipe wall and spacers.

Each independent claim recites in combination, an acoustic pulse generator, impedance matching layer, and thermal management system arranged in a certain way that is not suggested by the combination of references for the reasons given above. The remaining claims that have been rejected are dependent claims and are believed to be patentable for the reasons given above. Applicant believes that the claims are in condition for allowance, and such action is respectfully requested.

Respectfully submitted,

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